

Attorney Docket No.: DID-101
Appl. Ser. No.: 10/084,283

PATENT

IN THE CLAIMS

1. – 28. (Canceled)

29. (Withdrawn) A surgical device for passing suture through soft tissue comprising:

a first elongate superelastic member;

a straightening tube to receive said first superelastic member; and

a grasping mechanism operatively associated with said straightening tube and said superelastic member, said grasping mechanism temporarily clamping soft tissue while said superelastic member is advanced through said soft tissue.

30. (Withdrawn) A surgical device for passing multiple suture strands through soft tissue comprising:

a plurality of elongate superelastic members, each member having an opening to receive a strand of suture; and

a straightening tube to compress said members for insertion through a cannulae or trocar;

wherein said members are deployed through said soft tissue to create penetration sites separated by at least 3 mm.

31. (Withdrawn) A method for forming a superelastic suture passer having an elongate superelastic member that defines a proximal end and a distal end, a sharpened tip formed at said distal end of said superelastic member; and an axial slot cut in said superelastic member, said axial slot having a length greater than a thickness of said superelastic member, comprising:

inserting an expansion mandrel into said axial slot;

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heating the superelastic member to a temperature ranging between 300 and 600 degrees Celsius; and
reducing the temperature of the heated superelastic member to room temperature.

32. (Withdrawn) A method for passing suture through soft tissue comprising:

inserting a strand of suture through an opening defined in a superelastic member;
compressing said superelastic member with an external means from a first resting configuration into a second, compressed configuration for insertion through a cannulae;
puncturing soft tissue with a distal end of said superelastic member;
advancing said strand of suture through said soft tissue as said superelastic member is deployed from said external means wherein said superelastic member returns towards its resting configuration.

33. (Withdrawn) A method of rotator cuff repair comprising:

attaching a bone anchor incorporating at least two suture strands to bone;
compressing a superelastic member having an opening containing a suture strand with an external means from a first, resting configuration to a second, compressed configuration;
puncturing the rotator cuff with said superelastic member;
advancing said suture strand through said rotator cuff by removing said external means wherein said superelastic member returns towards its first, resting configuration;
removing said suture strand from said opening in said superelastic member; and
tying the at least two suture strands into a knot to attach said rotator cuff to said bone.

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34. (Withdrawn) A method of meniscus repair comprising:

engaging a suture strand having a first end and a second end with an opening in a superelastic member;

compressing said superelastic member with an external means from a first, resting configuration to a second, low profile configuration;

puncturing the meniscus at a first side of a tear with said superelastic member;

advancing said first end of said suture strand through said first side with said superelastic member;

removing said first end of said suture strand from said opening in said superelastic member;

puncturing the meniscus at a second side of said tear with said superelastic member;

advancing said second end of said suture strand through said second side with said superelastic member;

removing said second end of said suture strand from said opening in said superelastic member; and

tying said first end and said second end of said suture strand into a knot.

35. (Canceled)

36. (Canceled)

37. (Withdrawn) A surgical device for creating a mattress suture knot to secure soft tissue comprising:

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at least two superelastic members, each having a first resting configuration defining a first curve, an opening capable of receiving at least one strand of suture, and a sharpened tip to puncture soft tissue; and

at least one straightening mechanism to compress each of said superelastic members into a second configuration defining a second curve having a smaller diameter than said first curve.

38. (Withdrawn) The device of claim 37, wherein said superelastic members extend at an angle greater than 0 degrees relative to each other.

39. (Withdrawn) The device of claim 37, wherein said superelastic members extend at an angle greater than or equal to 90 degrees relative to each other.

40. (Withdrawn) The device of claim 37, wherein said superelastic members are separated from each other by at least 5 mm.

41. (Withdrawn) The device of claim 37, further comprising two straightening tubes to receive and separate said superelastic members, wherein ends of said straightening tubes are radially separated by at least 3 mm such that said superelastic members penetrate soft tissue with a separation of at least 3 mm.

42. (Withdrawn) The device of claim 37, further comprising two straightening tubes to receive and separate said superelastic members, wherein ends of said straightening tubes are axially

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separated by at least 3 mm such that said superelastic members penetrate soft tissue with a separation of at least 3 mm.

43. (Withdrawn) The device of claim 37, further comprising a grasping mechanism to temporarily clamp soft tissue while said superelastic members are advanced through the soft tissue.

44. (Withdrawn) The device of claim 37, wherein said opening is dimensioned to allow at least one suture strand to pass therethrough.

45. (Withdrawn) The device of claim 37, wherein said opening defines a crochet hook capable of engaging at least one suture strand.

46. (Canceled)

47. (Withdrawn) A surgical device for passing suture through soft tissue comprising:

a sliding member;

a straightening mechanism defining a tubular member with a central axis and capable of receiving said sliding member; and

a grasping mechanism operatively associated with said straightening mechanism and said sliding member, said grasping mechanism temporarily clamping soft tissue while said sliding member is advanced through said soft tissue;

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wherein an end of said straightening mechanism defines a curve through which said sliding member is directed in a non-axial direction relative to said straightening mechanism axis.

48. (Previously presented) A surgical device for passing suture through soft issue, the device comprising:

means for advancing suture;

means for straightening the suture advancing means, wherein the straightening means accommodates the suture advancing means therein and allows it to advance therethrough; and

means for grasping soft tissue, wherein said tissue grasping means is in communication with the straightening means;

wherein said suture advancing means directs suture through said soft tissue by advancing through the straightening means while said tissue grasping means maintains a relatively stable position with respect to said soft tissue.

49. (Canceled)

50. (Previously presented) A surgical device for passing suture through soft tissue comprising:

a body having a lumen to accommodate an elongate member having an opening to receive at least one strand of suture;

a first jaw and a second jaw connected to said body and encompassing at least a portion of the elongate member, one of the jaws moveable relative to the other and having an opening for allowing the elongate member therethrough and to the soft tissue; and

a puncturing projection having a distal portion and carrying a suture, the puncturing projection movable between a first position wherein the distal portion of the puncturing projection is substantially contained within an area between the first jaw and the second jaw and

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a second position wherein the distal portion of the puncturing projection extends beyond the first jaw.

51. (Canceled)

52. (Previously presented) A surgical device for passing suture through soft issue, the device comprising:

an elongate member for advancing suture;

an elongate tube that incorporates a lumen to accommodate at least a portion of said elongate member within said lumen and allows said elongate member to advance therethrough;

a grasping mechanism for grasping soft tissue, wherein said grasping mechanism is connected to said elongate tube; and

a strand of suture in connection with the elongate member;

wherein said elongate member directs the suture through the soft tissue by advancing the suture through said elongate tube into the soft tissue and outside said grasping mechanism through an opening in said grasping mechanism while said grasping mechanism maintains the soft tissue in a relatively stable position.

53. (Previously presented) A surgical device for passing suture through soft tissue comprising:

a first elongate member having an opening receiving a strand of suture; wherein said first elongate member includes a first resting configuration and is compressible into a second, stressed configuration, and returns towards said first resting configuration as a compressive external force is reduced;

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a second elongate member having a lumen to accommodate said first elongate member in the second, stressed configuration; and

a grasping mechanism connected to said second elongate member to clamp soft tissue while said first elongate member is advanced through the soft tissue to pass the strand of suture through the soft tissue outside said grasping mechanism through an opening said grasping mechanism.

54. (Previously presented) The device of claim 53, wherein the grasping mechanism further comprises:

a first jaw and a second jaw connected at a distal end of said second elongate member, one of said jaws moveable relative to the other.

55. (Previously presented) The device of claim 54, wherein one of said jaws has an opening for allowing said first elongate member therethrough and to the soft tissue.

56. (Previously presented) The device of claim 55, wherein said opening in said jaw is partially open and extends through a middle region of said jaw such that said jaw is removable from around a side of a strand of suture that has been passed into the soft tissue.

57. (Previously presented) The device of claim 53, wherein said opening in said first elongate member comprises an eyelet.

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58. (Previously presented) A surgical device for passing suture through soft tissue, the device comprising:

- an elongate member having an opening receiving a strand of suture;
- a strand of suture;
- an elongate tube having a lumen to accommodate said elongate member; and
- a grasping mechanism connected to said elongate tube to temporarily clamp soft tissue while said first elongate member advances the strand of suture through the soft tissue and outside said grasping mechanism through an opening in said grasping mechanism.

59. (Previously presented) A surgical device for passing suture through soft tissue, the device comprising: <

- an elongate member having an opening receiving a strand of suture;
- an elongate tube having a lumen to accommodate said elongate member; and
- a pair of jaws attached to said elongate tube to clamp soft tissue; wherein one of said jaws has an opening to allow said elongate member and attached suture therethrough to the soft tissue and outside the pair of jaws.

60. (Previously presented) The device of claim 59, wherein said opening in said jaw is partially open and extends through a middle region of said jaw such that said jaw is removable from around a side of a strand of suture that has been passed into the soft tissue.

61. (Previously presented) The device of claim 59, wherein said opening in said elongate member comprises an eyelet.

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62. (Previously presented) A surgical device for passing suture through soft tissue, the device comprising:

an elongate tubular member having a lumen; a suture passing member having a strand of suture attached thereto within said lumen; and

a grasping mechanism connected to said elongate tubular member to clamp soft tissue while the suture passing member slides within the lumen and passes suture through the soft tissue outside of the grasping mechanism through an opening in said grasping mechanism.

63. (Previously presented) The device of claim 62, wherein the grasping mechanism further comprises:

a first jaw and a second jaw connected at a distal end of said second elongate tubular member, one of said jaws moveable relative to the other.

64. (Previously presented) The device of claim 63, wherein one of said jaws has an opening for allowing the suture passing member therethrough and to the soft tissue.

65. (Previously presented) The device of claim 64, wherein said opening in said jaw is partially open and extends through a middle region of said jaw such that said jaw is removable from around a side of a strand of suture that has been passed into the soft tissue.

66. (Previously presented) The device of claim 62, wherein said opening in said suture passing member comprises an eyelet.

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67. (Previously presented) The device of claim 63, further comprising a handle to manipulate movement of the jaws.